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GOVERNMENT OF BANGLADESH  
MINISTRY OF ENVIRONMENT AND FORESTS

## EXECUTIVE SUMMARY

Volume 3



# FORESTRY MASTER PLAN

ASIAN DEVELOPMENT BANK (TA NO. 1355-BAN)

UNDP/FAO BGD/88/025

1993

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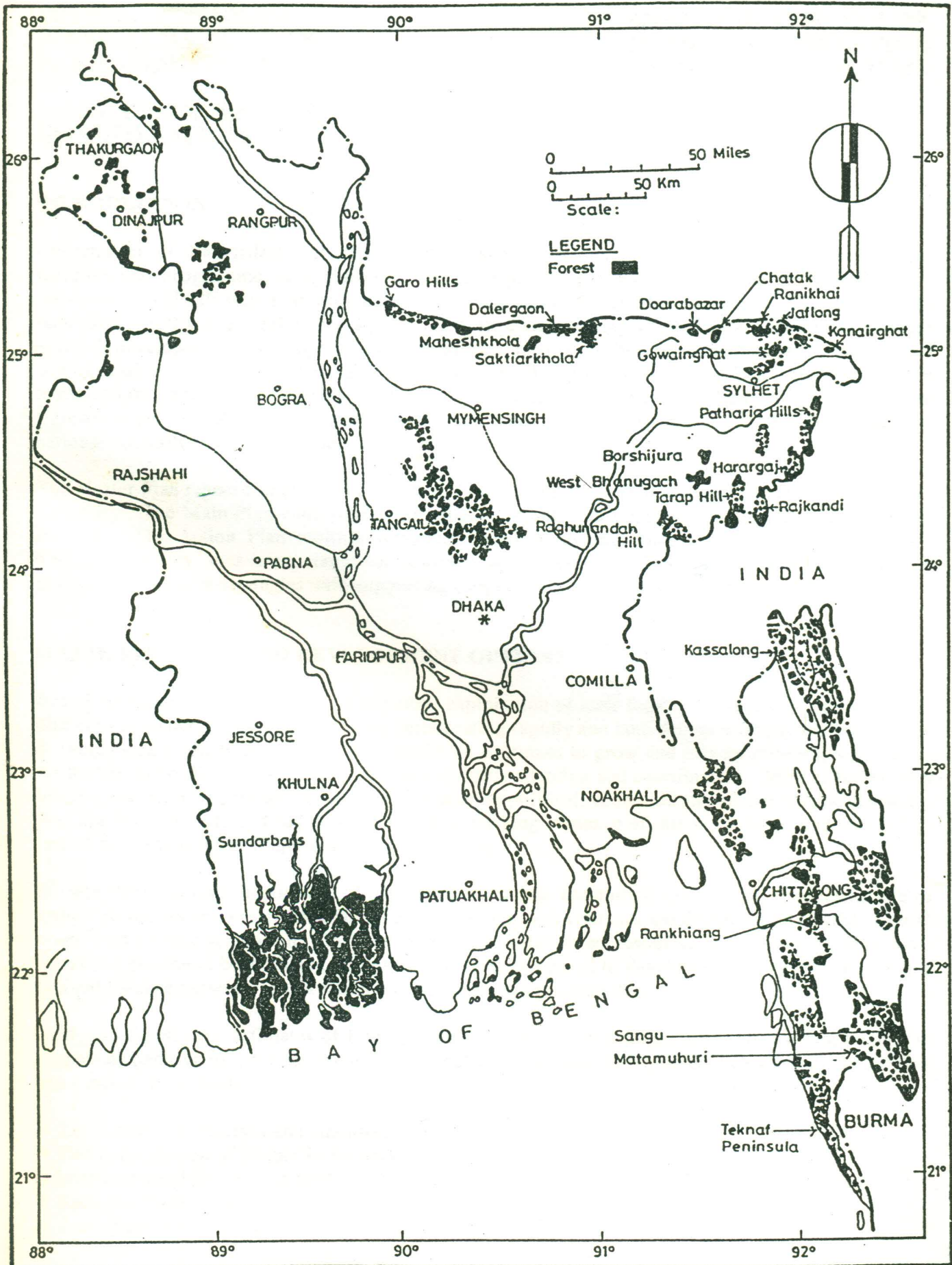
**PROJECT 372001/32-3**  
**FORESTRY MASTER PLAN,**  
**BANGLADESH (TA NO.1355-BAN)**

**ASIAN DEVELOPMENT BANK**  
**MANILA PHILIPPINES**  
**DATE: MARCH 1993**

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Bangladesh - Key Map



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**INTRODUCTION**

Government of Bangladesh, assisted by the Asian Development Bank and the United Nations Development Programme, is preparing a long term plan to preserve and develop the nation's forest resources. This 20-year Plan provides an overview of the Bangladesh forestry sector. It identifies sectoral strengths and weaknesses and presents an understanding of the steps required to enhance sectoral development. Focus was on institutional factors - policy, education and training and administrative structures. Special interest groups like the landless, women, non government organizations, minorities and private industry received additional attention. Bangladesh was an initial signator to the 1993 Rio Environmental Conference Agreement and Agenda 21. This Plan supports the national commitment to those goals and principals.

The Master Plan report contains three volumes - Main Plan, Five-Year Action Plan and this Executive Summary. The Main Plan consolidates six supporting Subteam Reports compiled from 21 Specialist Reports. The Action Plan outlines immediate work areas and costs. This Executive Summary highlights policy measures, required institutional reforms, critical development requirements, sustainable resource strategies with supporting programmes and associated costs.

**MAJOR STRATEGY AND DEVELOPMENT OPTIONS**

**Broad National Forestry Goals** - Currently, exploitation of state forests is beyond the land's natural productive capacity, forest resources are deteriorating rapidly and land degradation occurs from misuse or remains unproductive. Meanwhile, population continues to grow and private growers, who supply the bulk of national forest products receives very little attention and coordination. Most of the existing institutions and their procedures developed in another political, economic and environmental era; today they are inappropriate and redundant. The most striking evidence of this is the high, and increasing, rate of deforestation, now approaching 3% annually.

Despite their national importance, Government economic accounting ignores the productive role of natural resources and environmental values. This approach confuses the depletion of valuable natural assets with income generation. Government needs to value forest resources to reflect fully all national social and economic benefits and costs of lost forests compared to developing them and maintaining a rational balance between conservation and necessary commercial use.

Analysis of past, and estimates of future, conditions indicate the following goals are fundamental to supporting positive forestry development in Bangladesh. In turn, Government forest policy must reflect and support these goals:

- Environment protection and stability;
- Full participation of people in forestry plans and programmes;
- Increased productivity per land or time unit;
- Reduced waste; and,
- Institution restructuring.

**Existing Forest Policy Weaknesses** - Forestry as a sector of the economy, is viewed as a government department, despite the importance of private forest production. Several crucial aspects get little or inadequate mention in existing forest policy. Such aspects include: a proper landuse classification, the



role of forests as the biological foundation of sustained natural productivity, community participation, role of private sector, processing and utilisation of forest products, enterprise development, rural energy needs, involvement of voluntary organisations, importance of non wood forest products, and forestry extension.

**Strategy** - Government's past programmes and approaches could not arrest or replenish the declining forests owing to a range of constraints - funding shortages, operational problems, political instability, low level technology, inadequate policy and lack of accountability. Reversing this situation demands a new strategy and the necessary changes in land tenure, legislation, policy, marketing, technology and industrial processing to help correct past inactions. In future, attention must focus on the following main strategies and programmes supporting the following strategies:

- Enhancing environment preservation and conservation.
- Rational forest land use.
- Increased public participation and benefit from resource management.
- Expanding the resource base.
- Improving forest practices.
- Efficient resource utilization.
- Building up institutional strengths.

**Development Options** - Forest resource development, in support of national welfare, evolved several approaches in other countries. Commonly, development took the following form: privately owned and operated; publicly owned and privately operated; publicly owned and operated by the public (Forest Department or another Government Agency); and publicly owned and operated by a public autonomous entity involving wide-based participation. The last approach is potentially capable of providing maximum sustainable social and economic welfare. Increasingly, variations of this method are under adoption in several countries, based on a flexible system of tenurial and contractual arrangements. Experience in different countries shows that, normally, administrative bureaucracies are inappropriate to develop and manage forestry enterprises. Grouping law enforcement and enterprise functions in one agency is not a rational combination.

Government and public opinion on the future role and position of Bangladesh forests and their development is fluid and divided. The Master Plan reflects this and gives two distinct development alternatives for the sector within the overall required development strategy. Scenario 1 reflects the range of development possible within existing system constraints and technology. Scenario 2 presents the development potential possible by removing existing constraints imposed by current institutions and methods. Within the above strategy, both Scenarios presume the continuation of programmes over their schedule terms.

#### Need for Policy Review

Analysis clearly highlights the following areas of critical importance for:

- Controlling the high rate of deforestation.
- Practising appropriate, integrated land use for improving overall sustainable biological productivity.
- Arresting ecological degradation and erosion of biodiversity;
- Introducing scientific and sustainable forest resource management.
- Undertaking intensively managed high-input and high-output forest plantations as an investment enterprise.
- Reducing waste in harvesting and processing of forest products.
- Rationally restructuring the forest industry as an economic undertaking and improving its economic efficiency.
- Strengthening and intensifying forestry and forest products research and extension.
- Rehabilitating wildlife and wildlife habitats.
- Improving essential infrastructure for forest resource development;
- Meaningfully involving people, private companies, and non government organizations in the developing the forestry sector.
- Restructuring the forest sector institutions to make them capable of serving as effective agents for promoting sectoral growth, unfettered by bureaucracy.
- Improving, forestry human resources in terms of training, education facilities and incentives.
- Ensuring a multidisciplinary approach and intersectoral coordination and linkages in the forestry sectors.



Scenario development options compare the widest range of relative benefits, including: employment and income, equity considerations, improvement in productivity, investment needs, increased and wide-based participation. Also considered were: environmental, conservation and protection values of the resources, incentives for personnel and participants, and improvement in technical and professional skills. Scenario 2 separates the authority from enterprise functions in the forestry sector, and constructive implementation of this recommendation dictates major institutional restructuring.

**Marginal Structural Change Defined** - Government and its existing departments remain fully responsible for planning, implementing, regulating, developing and monitoring the Bangladesh forestry sector. Scenario 1 change visualized is only functional, allowing for increased delegation of higher responsibility, administrative and financial power within existing institutions structures and practices. It allows some decentralisation of decision-making and includes low level people's participation, but rigid budgetary positions block enhancement of delegation of administrative and financial power. Natural forest resource management standards apply, but development depends on the degree of decentralisation and delegation of power. The Scenario depicts limited and erratic growth of forest resources with success depending on bureaucratic reorientation and decentralisation.

**Major Restructuring Definition** - Scenario 2 separates Government's forestry sector interests in two - one body to assume the authority role, another to undertake economic development. The Forest Department becomes the former and a newly created three-tiered National Forestry Board heads up a system of independent enterprises undertaking investment activities in forestry. For effectiveness, the authority enforcing regulations to achieve policy goals should be strict and rigid, and process-oriented. Enterprise, on the other hand, needs autonomy, innovation, accountability, transparency and flexibility to meet ever-changing conditions. Above all, enterprises require result-orientation. These contrasting management styles cannot run efficiently under the same set of rules and guidelines. Separating the two functions in an arms length operating environment improves efficiency and effectiveness. Positive, productive direct public involvement, a fair beneficiary share in economic benefits, and high yielding forestry practices apply.

Enterprise is a neutral term meaning one or more units or firms under common ownership or control and can include the public, private, co-operative or joint sectors. Enterprises require administrative, financial, managerial and professional freedom in their functioning. Enterprises are the backbone of the proposed system. They originate from specific orders based on proposals to the National Forestry Board, supported by the State. As such, they represent overall national interests in forestry and have full functional autonomy. Apart from units under their control, enterprises will have centralised arrangements for organising institutional linkages, purchasing, sales, support services, training and extension, related to their overall activities.

**Authority Role** - The successor to the Forest Departments role is one of planning, preparing and implementing government policy and laws, revenue collection, and monitoring the enterprises' performance. Under the Ministry's direction, the Department's future responsibilities now include:

- Custody of state forest land, enforcement of the laws and rules and protection of the forest from illicit felling, unauthorized shifting cultivation and encroachment.
- Disposal of forest produce, collection of revenue and accounting for the same.
- Development and management of the resources in the national forests.
- Participatory plantation development in marginal, degraded and encroached Government lands.
- Forest extension activities in homestead woodlots, urban centres and privately owned forest land.
- Watershed management in hill slopes and catchments.
- Manpower development and operating the forestry training institutions.

A separate authority becomes responsible for managing game sanctuaries and National Parks and protecting wildlife.



**National Forestry Board** - This body becomes responsible for forestry investment according to an entrepreneurial system and principles. It makes economic sense to entrust investment activities to flexible, autonomous enterprises to ensure adequate returns and benefits, providing proper monitoring and guidance occurs. High yielding, intensive forestry practice is the norm and government lands become fully productive. This system incorporates the rural public extensively and provides direct benefits from a wide variety of locally managed forestry programmes. Such programmes involve growing, harvesting and processing both traditional commercial and non wood forest products on a profit-driven basis. Reversing environment degradation is a major goal based on pursuing environmental improvements as a profitable economic base for development.

The lowest tier consists of the individual operating enterprises, each based on a single product, a production function, or a geographic area covering a range of products. The second tier, selected from first tier representatives in an open, transparent fashion represents regional, product or functional-based enterprises nationally. The top tier, elected from the second tier in the same way, is the main body or board. The Board is responsible for national policy, coordination and arranging financing, and approving second tier plans. The second tier assumes similar responsibilities relative to tier one.

Government owned resources or processing facility form the hub to which the resources of local people, communities, and cooperatives contribute, and develop jointly in a synergistic fashion. For example, rubber in different parts of Bangladesh, Sal in central and northern Bangladesh, teak plantations in Chittagong Hill Tracts and other areas, can form the nucleus for effectively involving people and communities, private sector and non government organizations. Such arrangements will allow full enjoyment of benefits by participants.

While most of the Units will involve production and profit-oriented activities, the builtin system of flexibility allows non profit activities to function. Such possibilities include: management of protection areas, watershed management, wildlife and biodiversity conservation or land rehabilitation for social and environmental reasons - either as part of its mission or on behalf of other entities. Due to geographic and size considerations more than one unit under an enterprise is possible, carrying out the same or similar activities. The system, as conceived, is very flexible with a large number of possible options.

**Master Plan Programme Focus** - In presenting the development scenarios recommended, the Plan groups the various components into three major programmes, viz:

- **People-Oriented Programmes** - These provide direct benefit and involvement to local resource-dependent people.
- **Production-Directed Programmes** - They primarily concentrate on building up commercial wood supplies.
- **Institutional Strengthening Programmes** - This approach improves existing agency ability or support newly introduced programmes.



## PEOPLE-ORIENTED FORESTRY PROGRAMMES

Programmes included in this segment include Environmental Management, Participatory Forestry, Wood Energy Conservation, Non Wood Forest Products, and Bamboo Development.

### Major Issues

**Environment** - Increasing landlessness, the tremendous pressures of land fragmentation, and land use conflicts erode the nation's forest resources. Continuous pressure exists on natural areas and future population increases will worsen this. These pressures threaten even homestead forests and will result in further deforestation, encroachment, and unsustainable exploitation levels unless checked. Yet the nation can ill afford not to use its natural resources for increasing economic and social development. Other dominant environment issues are:

- Declining plant and animal variety.
- Present exploitation levels are not sustainable.
- Productivity is now unacceptably low and has a negative trend.
- Social equity remains unresolved.
- Absence of effective environment monitoring.

**Participatory Forestry** - Problems with land tenure, lack of available credit and credible benefit sharing arrangements are the three major issues inhibiting extensive public support to forestry development. Until these issues are satisfactorily resolved to attract widespread public participation in forestry programmes, replenishing, or even maintaining, existing forest resource levels in Bangladesh is unrealistic. Their resolution demands longer lease periods (equal to the main product growing period), legally enforceable crop sharing arrangements, and suitable credit facilities until crops generate a reasonable income. Benefit sharing formulas exist on Department-run schemes but this is not always the case with non government agencies or other government departments. In some cases, government-promised benefits get postponed or agreements remain unfulfilled. Schemes on other government lands are especially vulnerable, in addition to being the most costly; this means embankments, canals, roadside and railroad lands.

Several technical constraints contribute to low public acceptance of past unproductive forestry development efforts. Seed and seedling genetic quality and technical support is low. Species choice is limited and species and site matching is partially developed. Spacing and thinning is poorly understood and rarely practiced. Policy and institutional constraints hampering effective participation include the absence of:

- Women's involvement.
- Manpower training.
- Full use of non government organization.
- Political stability in the Chittagong Hill Tracts.
- Weak technical management.
- A balance between private versus public interest.
- Available planting areas.

**Wood Energy** - A national wood energy policy lacks formulation and a broad gap in fuelwood demand and supply is widening. The net deficit by 2013 is about 3.5 million cubic metres of fuelwood. Due to the fuelwood shortage, there is an increasing overuse of biomass fuels, particularly agricultural residues and cow dung, yet it is impractical to supply total domestic energy needs from wood. Meanwhile, a substantial amount of forest waste occurs harvesting high forests. Government introduced a popular ban on using fuelwood in brick fields, which is not enforced. However, a fully enforced ban discourages private wood growers by lowering fuelwood market prices. Growing wood strictly for fuel



is rarely economic, and excepting in urban areas, is not a market product. Peasants, 80% of the population, collect their own fuel needs free of cost.

**Non Wood Products** - Existing conditions are unhealthy for full development of these products. Responsive, long term policies need formulating and appropriate research and development undertaken. Policy formulation has to parallel government priorities and must focus on poverty alleviation, social equity; organized, sustained public participation, and improved management. Policy has to ensure that development and management involves an integrated approach. In this case, integration means incorporating effective and meaningful local public involvement as well as raising appropriate forest crops in association with traditional ones. Five issues dominate non wood product development:

- Uncoordinated development;
- Inappropriate forest management;
- Inadequate resource information;
- Under developed extension services; and,
- Unexploited social and economic development opportunity.

The chief problem facing future development and improvement is the lack of a single organization responsible for the collection, promotion and development of non wood products. Corrective action calls for responsive, long term policies geared to poverty alleviation, social equity and sustained public participation. Development strategies must promote the country's forests as integrated complexes of both wood and non wood forest products. An important technical need is expanded resource information to support development action. A further problem is the need for practical research advances. Coupled with this is improved delivery of information and positive guidance to people depending on such products for their livelihood.

**Bamboo Development** - Like non wood products, there is no single body responsible for coordinating the management, harvesting, processing and marketing of this important resource of Bangladesh. Logically, a body would become responsible for both bamboo and non wood forest products. Excepting harvesting, existing management practices do not properly maintain the public bamboo forest, meanwhile, large areas are still inaccessible. Meanwhile, scientific management of the village bamboos is non existent. A sharp fall in bamboo supply will occur in the near future unless programme efforts begin to offset unavoidable natural mortality.

#### **Indicated Development Strategies**

**Environmental Management** - Three principal strategies dominate environmental issues responses:

- Support rational landuses based on existing land productivity and competing uses.
- Manage the environment to preserve existing values, conserve plant and animal variety and to provide maximum benefits to dependent local peoples.
- Increase public participation in all programmes.

**Participatory Forestry** - Several general participatory tactics appear suitable and need introducing in Bangladesh. Such efforts use a broad-based approach to create local improvements in several conditions affecting participants welfare. Adopt a step by step programme approach emphasizing results and realistic targets. Use both top-down and bottom up planning and emphasize cooperation between participants and government. Focus on short term gains in income and welfare not long term technical goals. Ensure practical research development and disseminate the technology. Provide adequate technical assistance through effective extension. Ensure inputs are delivered on time. Provide appropriate and timely access to all resources, including subsidies or credit, on a selfhelp basis; and, require all beneficiaries to reinvest some of the harvested proceeds. Enforce protection of common property by group and peer methods. Develop clear strong rules and regulations defining relationships



and responsibilities between involved participants and groups. Finally, exert strong government pressure and incentives initially to support each effort, but do not prolong them if the programmes stagnate.

**Energy Conservation** - Straight forward strategies needed to resolve the major issues are:

- Develop and coordinate an appropriate policy.
- Introduce widespread energy conservation measures.
- Increase fuelwood supplies.
- Reduce wastage.
- Encourage energy substitution.

**Non Wood Products** - Development stratagem is to determine investment priorities based on enterprise-driven programmes, facilitated by government, but without its direct investment. This calls for a higher level of effective local participation to manage, protect and process local resources and using private as well as forest land. Finally, generate byproduct fuelwood in energy deficient regions and support established declining industries which have good economic potential.

**Bamboo Development** - The bamboo strategy is to:

- Increase production to reduce the future forecast supply gap.
- Make bamboo available as cheaply as possible.
- Foster bamboo-related small industries at the village level through a steady supply of raw material.
- Improve the quality and design of the bamboo products available to local and export markets.
- Provide increased rural employment and income generating opportunities.
- Improve research on genetic, silviculture, management, and product development.

## Programmes

Table 1 - Public forestry programme investment.

Public-Oriented Programme costs total Tk 9.0 billion in Scenario 1 and Tk 26.7 billion in Scenario 2, three times the former level. Cost estimates include all direct staff, infrastructure and operating costs. Scenario 2 adds two new programmes in non wood products and bamboo development, as summarized in Table 1. Table 2 gives the main physical and financial details in the public programmes.

People-Oriented Forestry Programmes, Tk Million		
Programme	Scenario 1	Scenario 2
Environment Management	1,483.6	5,635.3
Participatory Forestry	6,869.2	16,604.2
Wood Energy Conservation	613.1	1,244.1
Non Wood Forest Products	-	926.7
Bamboo Development	-	2,286.0
<b>Total, excluding contingencies</b>	<b>8,965.9</b>	<b>26,696.3</b>

**Environment Management** - Scenario 1 costs are Tk 1.5 billion. Main programme features are to:

- Support and expand the Department of Environment with the required seven offices, transportation and other equipment and environmental impact assessment training overseas to monitor and control environmental change more effectively.
- Give local training to 40,300 interested environment groups and individuals or rural communities, and run 40 public awareness workshops or seminars.
- Undertake 110 inventory, surveys, monitoring, evaluation or special studies.
- Supply consulting service, in environmental training, impact assessment or special technical areas.
- Begin a biological conservation programme by establishing 14 conservation centres throughout the country and give selected equipment to the natural history museum.
- Develop one existing national park and 10 new protected areas and place 44 resthouse for tourist development.



Scenario 2 totals Tk 5.6 billion, nearly four times the Scenario 1 programme. In the new scene, a newly formed Department of Natural Resource Conservation becomes totally responsible for planning, controlling and monitoring all aspects of environment conservation, backed up by new legislation and government policy. Other main differences from Scenario 1 are the addition of new programmes in biological conservation, protected area expansion and development and directly involving local communities in natural resource management and development. Scenario 2 components include:

- Establishing and supporting the new Department by building, equipping and furnishing seven regional offices, supplying 126 land vehicles, 36 boats, one marine vessel and two aircraft for transportation, research and patrol purposes.
- Providing monitoring equipment to the existing Department of Environment and Forests.
- Giving overseas training to a further 110 officers and 320,000 other local persons, plus hosting 70 more workshops and seminars to enhance public awareness of environment issues, problems and solutions.
- Increasing technical knowledge by a further 160 special inventory, survey and monitoring or evaluation studies.
- Developing and expanding a national park and 10 new protected areas more extensively and adding 30 more resthouse to increase tourist facilities.
- Establishing community management of local resource in selected locations throughout the country.

**Participatory Forestry** - Total Scenario 1 costs are Tk 6.9 billion, which covers new infrastructure and facilities, training and technology transfer, consultant services and field programmes on encroached and private land to attack poverty. Main features are:

- Construct, equip and operate 370 field offices, 500 staff residences and 400 nurseries.
- Provide 45 light and 28 medium vehicles plus 1,350 motorcycles and bicycles to improve staff mobility and efficiency.
- Train 360 persons overseas and 2,000 officers locally plus 350,000 beneficiaries.
- Support 650 months of special technical consultants.
- Fund 4.5 million poor families on 164,200 ha of plantations on encroached forest land, unused canal, embankment and railroad sides, plus non productive homestead lands.

Tk 16.6 billion is the estimated total programme in Scenario 2, nearly 2.5 time Scenario 1's amount. Compared to the former, Scenario 2 adds a new programme for private farmers and features:

- Higher component physical targets and work quality for repeated programmes.
- Additional infrastructure and facilities - 230 more offices, 300 staff residences and 800 nurseries.
- Increased vehicles - 75 light and 14 medium vehicles, plus 1,650 more bicycle and motorcycles.
- 240 more overseas training opportunities, more local training for 3,500 trainers and 300,000 beneficiaries.
- Consultant services increase by 300 months.
- A further 5.7 million families become involved in poverty alleviation and anti-encroachment efforts, which create a further 294,000 hectares of plantations.

**Non Wood Forest Products** - This programme concentrates on building up natural crops producing these products, managing these resource better and developing or rehabilitating their dependent industries. Total Scenario 2 costs amount to Tk 0.9 billion, benefit 43,000 families directly and create 334,000 ha of new or improved forest. There is no comparable Scenario 1 programme presented, these products are now ignored by the Ministry. Development concerns seven main products, presented in the following order of investment priority.

**Rattan** - Total investment Tk 381 million and involves three main areas - strengthening resource information and management, expanding rattan areas to increase supplies and rejuvenating the



rattan/bamboo cottage industry. Both private and public rattan resources need increasing and positive policy, helpful resource management rules and regulations facilitating management created. The programme envisages plantation directly by the Department, and others under participatory development and management. A private programme raises plantations on leased unused tea garden or degraded forest land by planters or furniture manufacturers, plus private plantation by small farmers. Plantation development, totalling 20,000 ha, requires an extensive nursery programme suitable for private operation. Rejuvenating the household-based and small scale rattan and bamboo handicraft industries involves applying new processing methods and product design, quality and finishing methods, supported by new extension training.

**Lac** - Estimated total investment for lac is Tk 326 million. This programme revitalizes the existing shellac producing industry, all supported by the necessary extension support, training and research and development services. A successful programme establishes extensive linkages amongst the agencies concerned - the Department, the Lac Research Centre, Department of Agriculture, and Bangladesh Agriculture Research Institute and Small Cottage Industries Corporation. Non government organizations are major players involved to help organize, mobilize and train lac growers. Infrastructure costs allows for office and residences and some refurbishing of the Lac Research Centre. Total planting area planned is 6,700 ha.

**Catechu** - Rejuvenating the catechu industry involves an estimated expenditure of Tk 38 million. This programme consists of training, consultancy services and private planting on 2,900 ha using agroforestry on farms and landless people on unproductive government land.

**Golpatta** - This is a planting programme costing Tk 20 million on 800 ha. Other improvements in resource assessment and management gets covered under an UNDP/FAO project recently started.

**Murta and Hogla** - Developing these products consists of starting new murta areas and redeveloping manufacturing processes and products in both industries, for a combined investment of Tk 76 million. Industry development in both cases focuses on improving financial, marketing and technology in product manufacture and strengthening local community groups in participatory management of local resources. Separate programme costs are murta Tk 74 million and hogla Tk 1.5 million.

**Medicinal Plants** - Total programme costs are Tk 86 million. Investment supports the establishment of 1,500 ha of medicinal plant farms. The farms involve landless people on forest and other government land in participatory programmes, private farmers, and the drug companies on leased tea garden or forest land.

**Wood Energy Conservation** - The programme cost for Scenario 1 is Tk 0.6 billion which provides continued support to similar programmes presently run by groups outside the Ministry of Forests. The plan is to offer some infrastructure support, provide a higher level of training, allow programme monitoring and assessment and provide improved stoves for distribution in towns and large villages in the energy deficient northwest. In summary, important features are:

- Introduce a public education programme in energy short areas, equipped with two audio visual vans, light vehicles and 160 bicycles.
- Train 4,400 officers locally and beneficiary trainers in energy conservation methods and give 720 regional workshops and seminars on solving local energy problems.
- Eight studies to monitor and evaluate programme performance or develop new programmes.
- Fund the distribution of three million improved stoves.



Table 2 - Public forestry programme components summary details.

People-Oriented Programme Component Summary					
Programme/ Component	Physical Targets			Tk Million	
	Units	Scenario 1	Scenario 2	Scenario 1	Scenario 2
<b>Environment Management</b>					
1. Institution Strengthening/Support	na			625.9	1,661.8
2. Training/Technology Transfer	no.	40,400	360,500	131.5	831.5
3. Research, Development, Studies	no.	110	270	69.3	240.4
4. Consulting Services	month	1,670	1,900	358.3	496.9
5. Conservation					
5a. Herbarium and Botanical Gardens	no.		10		156.6
5b. Regional Nature Centres	no.	14	35	6.1	51.8
5c. National and Regional Zoos	no.		4		278.2
5d. Natural History Museum	no.	1	1	5.0	195.7
6. Protected Area Expansion/Development					
6a. Existing Parks/Sanctuaries	no.		1	46.2	69.0
6b. Develop New Protected Areas	no.	1	1	228.0	456.0
6c. Resthouse Development	no.	10	10	13.4	30.4
7. Community-Based Resource Management	na	44	72	-	1,167.0
Total				1,483.6	5,635.3
<b>Participatory</b>					
1. Institution Strengthening/Support	na			3,896.7	7,265.7
2. Training/Technology Transfer	no.	352,400	650,000	392.0	715.0
3. Research, Development, Studies	no.	650	950	60.0	100.0
4. Consulting Services	month	5,600	25,800	140.4	213.4
5. Poverty Alleviation and Anti Encroachment					
5a. Agroforestry	families	33,300	33,300	114.0	672.9
5b. Woodlots	families	17,800	120,000	668.8	869.4
5c. Strip Planting	families	4.4 million	10 million	420.4	2,420.8
5d. Private Homestead	families	-	65,000	1,177.0	3,477.6
5e. Private Fields	families	4.5 million	10.2 million	-	8,310.2
Total				6,869.3	16,604.3
<b>Non Wood Forest Products</b>					
Rattan Development					
2. Lac Rehabilitation and Development	families	No Programme	16,000	No Programme	381.5
3. Lali/Catechu Rehabilitation	families		17,000		326.1
4. Murta Development	families		6,700		38.1
5. Medical Plants	families		8,400		74.0
6. Hogla Development	families		1,800		85.6
7. Golpatta Plantation	ha		na		1.5
Total			43,300		20.0
<b>Wood-Based Energy Conservation</b>					
1. Institution Strengthening/Support	na			148.9	216.6
2. Training/Technology Transfer	no.	4,800	385,000	61.2	306.0
3. Research, Development, Studies	no.	8	57	28.0	43.0
4. Wood Energy Conservation					
4a. Improved Stove Distribution	families	3.0 million	3.0 million	375.0	375.0
4b. Charcoal Kilns	no.		1,130		3.5
4c. Biomass Plants	families		40,000		300.0
Total	families	3.0 million	3.04 million	613.1	1,244.1
<b>Bamboo Development</b>					
1. Resource Management and Development	ha	No Programme	60,000	No Programme	1,577.6
2. Product Development and Improvement	million		344		699.1
3. Research Development and Studies	no		6		9.3
Total					2,286.0
Total, excluding contingencies				8,966.0	26,696.5

Scenario 2's programme has a total cost of Tk 1.2 billion, twice the former Scenario level. In addition to the above features, Scenario 2 offers:

- Four additional light vehicles and 12 medium vehicles plus 12 motorcycles to improve staff mobility.



- Six specialists get overseas training in wood energy skills, 318,000 officers and local trainers receive training and 120 more workshops and seminars run to increase public awareness.
- Fifty more special studies to assist programme development and operation.
- Two new conservation programmes - on a priority basis, one in charcoal making and a second in biogas plant installation.

**Bamboo Development** - Total Scenario 2 cost are Tk 2.3 billion; there is no Scenario 1 comparable programme. Activities targeted to offset the forecast bamboo shortage include:

- Infrastructure development to include building, equipping and operating a bamboo germ plasm centre and a tissue culture laboratory, plus a craft training centre. The latter also serves the non wood products training needs to introduce modern design, manufacture and marketing into the handicraft industry.
- Overseas degree training for six specialists and local training for 53,000 farmers in growing and managing methods.
- Assisting regeneration on 60,000 ha of natural bamboo forest and a planting programme on 26,800 ha of public and private land.
- Establishing rural centres to treat 340 million pieces of bamboo with wood preservatives.

## PRODUCTION-DIRECTED FORESTRY PROGRAMMES

### Major Issues

**Forest Management** - Major issues confronting Bangladesh's forest management today are:

- Increasing deforestation and encroachment rates.
- Low net land productivity and utilization.
- Lack of participation and benefit to local populations.
- Serious gap between forest products supply and demand.
- Unsustainable management practices in natural forests.
- Unreliable data.
- Poor service conditions for Departmental staff.

Today, most forest land lacks tree cover and is losing soil. A serious shortfall in forest product availability exists compared to local demand. New and better, more productive technical forest management is needed, from the time of seed collection to harvesting, especially in the Hill Forests. Deforestation is a critical problem and results mainly from shifting agriculture, and illegal occupation of forest land; and, it remains uncontrolled. Direct results of deforestation from inappropriate forest practices are increased soil erosion, declining water yields, and decreasing biological diversity.

Yet Bangladesh is naturally endowed with excellent tree growing conditions and an inventive populace. Both need harnessing in order to arrest and reverse forest destruction trends. Bangladesh faces an immediate and severe crisis in industrial raw wood material for its forest industry. This will decrease manufactured products available for domestic consumption or for export. Urgent across-the-board remedies are required now. How to achieve the productive potential of Bangladesh's forest is a major technical and institutional issue.

One way to improve the situation is to have local people protect local resources. However, involving these people effectively calls for major institutional changes and second for significant local redistribution of resource income. These requirements demand strong social and political backing from government. The remaining natural forests are simply incapable of providing commercial products, conserving biological resources and protecting environmental values on a sustained basis.

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**Manufacturing Industry** - The predominate industry issues arising in the sawmilling sector are the increasing shortage of raw materials and the inadmissible high sawing waste. Technically, the log measurement system is antiquated and masks inefficiencies. Economically and environmentally, species utilization is unacceptably low. Market acceptance of seasoned and treated woods is weakly developed. Moreover, there is a lack of sawlog and sawnwood quality and size standards. In the pulp and paper industry, outdated technology in the old mills creates a potential pollution problem, but the looming raw material shortages is the dominate issue in this sector. With the public sector, poor operating performance and unprofitable or marginal profitability of enterprises describe the picture.

### **Principal Strategy**

**Forest Management** - Future forest management strategy concentrates on reducing forest product shortages and increasing production within the bounds of the land's productive capacity. This means major improvements in forestry practices and reduced deforestation and encroachment. Achieving these goals requires fully involving and benefiting local people, minimizing environment damage and introducing the most intensive forest and plantation management practices. Bringing the Chittagong Hill Tracts under productive land and forest management is fundamental to both Scenarios, without this occurring Bangladesh has no chance to significantly improve the current forest resource situation.

**Industry Development** - Improving environment protection and forest management, and creating a skilled forestry work force calls for a permanent forest road network of much higher construction standards. Also required is new harvesting equipment for proper and safe harvesting on steeper ground, as well as replacing existing old equipment of the Forest Development Corporation.

Sawmilling development strategies are to:

- Replace existing low recovery sawmills with higher recovery mills.
- Phase in the new mills, balanced to plantation supplies, first converting mills using planted species.
- Restructure as a joint sector enterprise and rebuild the Kaptai Sawmill.
- Facilitate industry financing assistance. The need is for a self-financing programme under the normal banking system, not a government funded one.
- Evolve either workable long term raw material tenure arrangements, or guaranteed supplies, since financing agencies will require this for loan security.
- Offer reasonable compensation to owners leaving the business or facilitate new ventures which combine several former operations. Physically eliminate all replaced outdated equipment.
- Form a board composed of industry and government appointees to develop, coordinate, and promote common positions in modernizing and rationalizing the industry as the programme requires effective and equal participation of the private sawmill owners.

In pulp and paper, development should concentrate on expanding paper production to support government literacy and social standards before satisfying commercial demands. Expansion is only possible locally when new raw material supplies become available as a result of this Plan, or are imported. When new mills appear require up to date pollution control measures to reduce potential environmental damage. Require old mills to upgrade to similar standards when undergoing major revision to their manufacturing processes.

**Redirecting the Public Sector Wood Industry** - Recommended actions to correct the Forest Development Corporation's operating profitability are: first; retain, rehabilitate and restructure the Kaptai Timber Extraction Unit as an effective independent public corporation. Units to retain, rehabilitate and restructure as joint ventures are the Kaptai Sawmill and Sangu Valley Plywood Companies (the latter in Scenario 1 only), all three seasoning and wood preservation plants, and the Khulna Cabinet Plant and Hardboardmill. Keep as a public corporation the Sangu-Matamurhi Extraction Unit in Scenario 1, but liquidate it, and the related plywood company for Scenario 2. Finally, close down and liquidate the assets of the: Chittagong Particleboard and Veneer Mill, Kaptai



Planermill, Chittagong Furniture Cabinet and Flush Door Factories, Dhaka Cabinet Factory, and Eastern Woodworks.

In the case of the Chemical Industries Corporation, sell as a going concern the Ujala Match Factory.

### Programmes

Table 3 - Programmes directed to industrial production.

Four specific programmes directly target traditional industrial products - Industrial Plantations to increase wood supplies, Wood Harvesting to improve raw material deliveries, Sawmill Rationalization and rehabilitation to remove inefficiency and Pulp and Paper Expansion. Total investment in Scenario 1 is Tk 31.1 billion and in Scenario 2 Tk 72.8 billion, an increase of more

Production-Directed Forestry Programmes, Tk Million		
Programmes	Scenario 1	Scenario 2
Plantations	9,383.0	14,417.6
Wood Harvesting	3,951.2	5,087.9
Sawmill Rehabilitation	8,883.0	21,034.0
Pulp and Paper Development	8,874.0	32,238.0
Total, excluding contingencies	31,091.2	72,777.5

than twice. These costs estimates, summarized in Table 3, only include the direct programme cost. All plantation related recurrent operating cost and overheads and infrastructure appear later in Institutional costs. Industry operating cost are also excluded, Table 4 details component activities.

**Industrial Plantations** - Scenario 1 costs total Tk 9.4 billion for a 398,300 ha planting programme based on existing technical methods and knowledge. Specific components relate to industrial products from Hill Forest areas ((312,300) ha). The other components have strong environmental payoffs besides providing industrial materials. Others benefits include Sal Forest rehabilitation (23,000 ha), protected area rejuvenation (13,000 ha) and cyclone protection (50,000 ha). A programme of this magnitude depends on fundamental public support for successful implementation and therefore commands better arrangements and firm, reliable benefit-sharing with local residents in almost all cases.

Scenario 2 projects a total investment of Tk 14.4 billion, an increase of 50% over Scenario 1. This involves 465,300 ha of very high yielding, intensively managed plantations to supply national forest product needs and eliminate dependence of the disappearing Hill Forests. Compared to Scenario 1, this programme adds a further 67,000 ha of plantations, 36,000 ha in the Hill Forest area, 21,000 ha in Sal Forests and 10,000 ha more cyclone protection areas. Also included is a specific programme to address watershed protection problems in the Hill Forest areas.

**Wood Harvesting** - Scenario 1 cost is Tk 3.9 billion, the chief programme features are to:

- Replace the Forest Development Corporation's worn out harvesting equipment and to provide suitable new equipment for harvesting plantations on steeper ground: total annual wood production affected is 223,000 cubic metres annually.
- Give overseas training to nine officers and support two consultants on extraction operations.
- Fund a feasibility study to assess improving access in undeveloped areas.
- Provide for 3,100 km of permanent roads to control costs better, support a skilled work force and reduce environment damage.

In contrast, Scenario 2 investment totals Tk 5.1 billion, an increase of 30% over Scenario 1. In comparison, Scenario 2 supplies mechanical equipment for a total annual harvesting production of 333,200 cubic metres. It gives specialized training to 29 more specialists and provides for 10 more harvesting consultants and two more feasibility studies to reorient harvesting operations from natural forest to plantations. The Scenario supports a significantly larger permanent road system, adding a



further 8,600 km to support intensive forest management and enable much higher environmental standards in road construction.

**Industrial Manufacturing** - Sawmill rehabilitation in Scenario 1 has a total cost of Tk 8.9 billion to provide 510 new more specialized and resource-efficient sawmills, while replacing 3,800 old mills. Costs in Scenario 2 total Tk 21.0 billion, nearly 2.5 times more than Scenario 1, which builds over 900 new mills and replace the same number of old mills as Scenario 1. Expansion in the pulp and paper sector in Scenario 1 amounts to Tk 8.9 billion to produce 85,000 air-dry tonnes annually of new newsprint and printing and writing papers. Projected Scenario 2 expansion totals 191,000 tonnes annually in new production, which also includes industrial and specialty papers. Estimated cost is Tk 32.2 billion, more than six times the Scenario 1 level.

Table 4 - Component summary of production-directed forestry programmes.

Production-Directed Forestry Component Summary					
Programme/ Components	Physical Targets			Tk Million	
	Units	Scenario 1	Scenario 2	Scenario 1	Scenario 2
<b>Plantations</b>					
1. Hill Forest Area					
1a. Industrial Timber	ha	62,300	90,000	1,666.7	3,029.8
1b. Industrial Timber/Pole	ha	200,000	155,000	4,976.3	5,158.5
1c. Watershed Protection	ha		58,300	-	1,870.6
1d. Pulpwood Plantation	ha	50,000	45,000	1,187.5	1,497.6
2. Sal Forest Rehabilitation					
2a. Natural Forest Enrichment	ha	23,000	23,000	725.6	872.8
2b. Plantation Replacement	ha		21,000		694.4
3. Parks/Sanctuary Rehabilitation	ha	13,000	13,000	361.4	564.7
4. Cyclone Protection	ha	50,000	60,000	465.0	729.2
Total		398,300	465,300	9,383.0	14,417.6
<b>Wood Harvesting</b>					
1. Harvesting Equipment	m <sup>3</sup> /A	223,300	333,500	3,196.4	2,793.1
2. Training/Technology Transfer	no.	9	40	10.8	51.7
3. Research, Development, Studies	no.	1	3	11.0	33.9
4. Road Construction	km	3,100	11,600	736.1	2,209.2
Total				3,951.2	5,087.9
<b>Industry/Manufacturing</b>					
1. Sawmill Industry Rationalization	no.	512	913	8,883.0	21,034.0
2. Pulp and Paper					
2a. Newsprint	ADT/A	49,000	59,000	4,766.0	7,005.0
2b. Printing and Writing Paper	ADT/A	36,000	63,000	4,108.0	7,260.0
2c. Wrapping and Packaging	ADT/A	-	38,000	-	5,789.0
2d. Speciality Papers	ADT/A	-	116,000	-	12,184.0
Total				17,757.0	53,272.0
<b>Total, excluding contingencies</b>				31,091.2	72,777.5

## INSTITUTIONAL STRENGTHENING PROGRAMMES

### Major Issues

**General Institutional Aspects** - Forestry as a sector of the economy is now primarily a government department, in spite of the fact that seventy percent of all forest products originate on private lands. Other major forestry issues relevant in Bangladesh are:

- Inadequacies of the current national forest policy.



- Irrelevance of the current forestry legislation and related regulations to address the present concerns of forestry.
- Weaknesses, shortcomings and functional conflicts in public forestry organisations and institutions.
- Lack of attention paid to positive and coordinated human resource development.
- Poor impact of forestry research, and its weak facilities and lack of autonomy.
- Inadequate forestry extension efforts.

### Chief Strategies

A declining forest resource and new government development philosophy define the following new tactics for the forestry sector:

- Adopt improved technology to increase productivity and socioeconomic contributions of the sector.
- Give management support to intensive and rational resource use involving proper planning, discipline, infrastructural facilities, skills, and a commitment to avoid continued destruction.
- Ensure increasing efficiency in the use of forest resources for meeting social and economic targets.
- Adopt appropriate technology and good technical management to attain resource sustainability.
- Structure forestry investment to compete with other government development options.
- Promote wide-based public participation, involving people directly and positively in forestry sector development activities.

**New Forest Policy** - Three interrelated imperatives are the base for new forest sector policy - Sustainability, Efficiency and Participation. Policy implementation demands a balance amongst these imperatives, rather than maximising any one. The important functions of forests in protecting soil, water, wildlife and biodiversity are vital for the welfare of the present and future generations. Sustainable forest resource use is essential to prevent environmental deterioration and economic decline and to safeguard ecological processes. An important function of the forests is production of goods for direct consumption. However, investments in production forestry have to compete with other investment alternatives to justify public funds. Participation of people is both an objective and means of development; it is crucial in charting the course of forestry development in the right direction, and in underwriting its sustainability.

New policy goals aim to ensure ecologically sound and sustainable development of forest resources, and to support economic development through balanced and appropriate measures of resource expansion, conservation, management and utilization. Policy should link all sectoral groups and interests, as well as involving people in all stages of development. It is important to establish a rational balance between the ecological and economic roles of forests. The long term goal of the new policy is to enhance the contribution of the forestry sector to the country's ecology and economy. A forest policy framework, included in the main report, covers policy measures aimed to achieve these objectives.

**Legal System Changes** - Updating requirements should repeal redundant laws and rules and introduce a new Act for the Conservation and Development of Forests, Trees and Wildlife. This must reflect more fully national development goals and sectoral development objectives and include positive provisions to promote and facilitate achievement of policy objectives. The system has to provide for measures to: prevent environmental degradation; remove weaknesses and inefficiencies; promote improved technology; encourage human resources development; support appropriately structured organisations; create flexible arrangements for people's participation; and, to facilitate coordination and conflict resolution.

**Sectoral Organization** - Master Plan analysis considered eight alternative sector organization structures compared with the Status Quo. Of these, the Plan elaborates two - a marginal change (Scenario 1) and a major change (Scenario 2). Scenario 1 approximates the most optimistic outcome possible with existing systems and procedures. Scenario 2, the Planning Team's strong



recommendation, is the best alternative to arrest environmental degradation in a positive fashion and to build national forest resources.

**Research** - Forests in Bangladesh critically need research support to: improve productivity; reduce losses and wastage; maximize utilisation; improve product quality and economic value: ensure sustained resource management; conserve genetic plant and wildlife resources; and develop non wood products. Important areas of practical research where immediate output is vital are: homestead forestry, agroforestry; watershed management; coastal area afforestation, management and protection; high yield plantations; wildlife conservation and management; genetic resource conservation and forestry interfaces with other sectors.

Future strategy requirements command changes in the planning and management of forestry research and development with a view to involve users productively. A more rigorous approach to preparing and implementing research work plan is an obvious need, This would raise the status of forestry-related research, increase its relevance to real-life problems and permit it to influence forestry policies. Clearly, establishing research planning priorities demands goal-orientation and cost effectiveness to become relevant to today's problems.

**Education, Training and Extension** - Future education and training needs require up to a tenfold increase in professional, technical and vocational staff, all supported by quality improvements in curricula and revised modern courses and course materials. Beneficiary training needs are even greater in numbers involved. Present infrastructure, facilities, and staff can not cope with this demand without major infrastructure improvements, additional equipment and qualified staff.

Improved forestry extension services are essential for understanding farmer's problems and perceptions and developing effective input supply and receiving mechanisms. Services also have to support farmers carrying out operations on schedule, and provide on site training in participatory mechanisms at the village level. Extension has to impart knowledge on technical innovations and research results, as well as provide farmers technical improvements in a reliable manner.

Table 5 - Programmes to build institutions.

Institution Strengthening Programmes				
Programme	Scenario 1		Scenario 2	
	Tk Million	%	Tk Million	%
Institution Infrastructure/Recurrent Costs	13,995.8	79.7	35,056.3	86.0
Education Facility	217.2	1.2	1,009.6	2.4
Training/Technology Transfer	805.0	4.6	1,105.0	2.7
Research, Development Studies	140.0	0.9	240.0	0.6
Consulting Services	217.8	1.2	627.7	1.5
Institutional Changes			337.3	0.8
Forest Research Development	2185.7	12.4	2,428.2	6.0
<b>Total</b>	<b>17,561.5</b>	<b>100.0</b>	<b>40,804.1</b>	<b>100.0</b>

### Programmes

Without the uncompromised changes needed in policy, management and institutions, Bangladesh's natural forests can only decline further.

**A Calender for Change** - Making changes institutionally requires a managed transition based on a definite plan. The changeover needs managed on the basis of strict time schedule and comprehensive plan. Once the change is

decided, it needs close piloting by Government in well thought out, but flexible phases. A long transition period is possible, but the Plan purposively recommends a short one to maintain direction and dynamism. Institutional programme cover items that are not directly related to operating or field programmes, including staffing, organization, education, training, research and administration items. Estimated Scenario 1 costs are Tk 17.6 billion, compared to Scenario 2 (Tk 40.8 billion, an increase of 130%). These costs include day to day recurrent operating costs for staff,

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equipment, vehicles and buildings, as well as cost of building or purchasing infrastructure, equipment and vehicles. Table 5 gives a comparative programme summary, while Table 6 presents component details.

**Scenario 1** - Forest Department institutional strengthening and recurring operating cost amounts to Tk 14.0 billion. In addition to staff, vehicle and equipment operating costs, this includes: constructing 132 field offices of various categories and 72 extension nurseries; purchasing and replacing 24 light vehicle, 35 motorcycles and seven marine vessels. Improving the education infrastructure constructs and equips facilities for a professional, technical and vocational staffing compliment of 23,500 by the end of the Plan, but operating costs come from normal educational funding sources.

Training efforts inservice cover 900 officers for overseas training and 510,000 locally for inservice training. Estimated total costs are Tk 805 million. Research development studies provide for eight special studies at a cost of Tk 140 million to monitor programme implementation performance or undertake special planning studies. Consulting service to provide required technical assistance of 1,040 months, estimated at Tk 218 million.

Table 6 - Institutional programme component details.

Institutional Strengthening Programme and Component Summary					
Programme/ Components	Physical Targets			Tk Million	
	Units	Scenario 1	Scenario 2	Scenario 1	Scenario 2
1. Institution Changes/Restructuring	no.	132	26	13,995.8	35,056.3
2. Education Facility Improvement	Levels	4	4	217.2	1,009.6
3. Training/Technology Transfer	million	0.51	1.6	805.2	1,105.0
4. Research, Development, Studies	no.	8	8	140.0	240.0
5. Consulting Services	month	1,038	2,600	217.8	627.7
6. New Legislation/Policy Implementation	na.				337.3
7. Research Development Programme					
7a. Field Research Station	na			262.6	262.6
7b. Laboratory Facilities	na			262.6	262.6
7c. Library Improvement	na			50.1	50.1
7d. Genetic Seed Improvement/Production	na			315.0	315.0
7e. Seed Storage Facilities	na			243.9	243.9
7f. Technology Transfer	na			100.0	100.0
7g. Scientist Training	no.	922	1,024	301.5	444.0
7h. Programme Operating Costs	na.			650.0	750.0
Total				2,185.7	2,428.2
Total, excluding contingencies				17,561.5	40,804.1

Research development is a major factor budgeted at Tk 2.2 billion, including:

- Infrastructure and equipment for existing field research stations, laboratory and library facilities.
- Constructing, equipping and operating genetically improved seed production areas and seed storage facilities takes Tk 315 million.
- Tk 100 million is to establishment and support a scientific networking and information system domestically and internationally.
- Provision for overseas and local training for 920 scientists at Tk 301 million.
- Tk 650 million to support the research field and operating programmes.

**Scenario 2** - Restructuring the major institutions and supporting this change on an entrepreneurial basis is expected to cost Tk 35.1 billion, 2.5 times Scenario 1. Much of the staffing and associated operating and infrastructure cost shift to individual enterprises with the restructuring. Included here are the



construction and equipping of 26 offices and provision of nearly 1,500 land, water and air transportation vehicles. Building and equipping the education facilities for a required staffing level of 36,200 highly skilled professionals, technicians and vocationally-trained persons is worth Tk 1.0 billion, more than 4.5 times Scenario 1 estimate. Inservice local training for 900 specialists and one million local trainers and beneficiaries costs Tk 1.1 billion, an increase of 37% over Scenario 1.

Tk 240 million, a 70% increase, covers special performance evaluating and planning studies to help guide the sector over the Plan. Research development is identical to the Scenario 1 programme with the exception of overseas training for an additional 100 scientists and a slightly larger operating budget. Finally, special studies and projects supporting the reorganization and to develop the required new laws, regulations and policies will use Tk 337 million, an item unnecessary in Scenario 1.

## PLAN IMPLEMENTATION

Proposed development options contrast two distinct approaches. Scenario 1 represents a modest investment within existing working systems and standards, allowing for marginal change or improvement. Scenario 2 adopts intensive high investment levels to achieve optimum targets, and incorporates new technology and working methods. Scenario 2 requires a high level implementation unit to develop detailed plans and monitor physical and spearhead achievements. Scenario 1 implementation takes place by extending present programmes.

### Investment Programme

**Estimated Plan Costs** - All expenditures are part of the investment programmes, with two exceptions. With forest-based industries, the operating costs to run the industries are excluded, and Scenario 1 estimates exclude the full costs of the benefit-sharing arrangement needed to get the required public support.

Scenario 1 investment estimate is Tk 60.2 billion (\$1.5 billion) including physical contingencies. Foreign exchange costs amount to Tk 20.9 billion (\$539.8 million) or about 74% of total plan cost. About 75% of the cost covers the investment items and their corresponding contingencies while recurrent costs take up the remaining 26%. Investment in programmes intended for direct public benefit is 16% of the total, production-directed investment totals 54% (industry 38% and plantations 16%) and institutional expenditure amounts to 30%. Figure 1 summarizes programme costs, Table 7 gives major details.

Scenario 2 estimated total plan cost is Tk 145.1 billion (\$3.7 billion), foreign exchange is Tk 52.1 billion (\$1.3 billion) representing about 36% of the Plan cost. Of the total, about 75% covers investments items and the rest, 25%, accounts for recurrent costs. Components directly targeting public involvement use 19% of the investment. Programmes with a strong commercial orientation total 52% (industry rehabilitation and expansion 42%, and plantation plantations 10%), while the share for institutional support and strengthening is 29%. Figure 2 pictures component investments.

### General Financing Plan

**Cost Phasing** - Development estimates separate costs in 5-year increments which shows that investment grows, levels off and decreases during the four periods of the Plan. On the other hand, recurrent

PLAN COST SUMMARY  
(Billions)

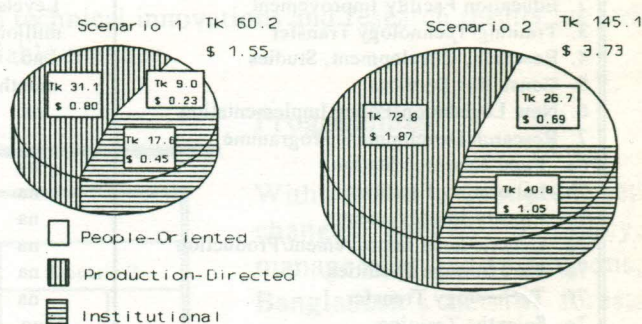


Figure 1 - Investment Programme Comparisons



Table 7 - Comparative Summary of Plan Costs

Comparative Plan Costs				
Programmes	Scenario 1		Scenario 2	
	Tk Billion	%	Tk Billion	%
<b>People-Oriented Forestry</b>				
Environment Management	1.48	2.6	5.63	4.0
Participatory Forestry	6.87	11.9	16.66	12.0
Wood Energy Conservation			1.24	0.9
Non Wood Forest Products			0.93	0.7
Bamboo Development	0.61	1.1	2.29	1.6
<b>Total</b>	<b>8.96</b>	<b>15.6</b>	<b>26.75</b>	<b>19.2</b>
<b>Production-Directed Forestry</b>				
Industrial Plantations	9.38	16.3	14.42	10.4
Wood Harvesting	3.95	6.9	5.09	3.7
Sawmill Rehabilitation	8.88	15.4	21.03	15.1
Pulp and Paper Expansion	8.88	15.4	31.16	22.4
<b>Total</b>	<b>31.09</b>	<b>54.0</b>	<b>71.70</b>	<b>51.6</b>
<b>Institutional Strengthening</b>				
Department/Enterprise Infrastructure	0.38	0.6	3.79	2.7
Department/Enterprise Recurrent Costs	13.62	23.6	31.26	22.4
Education Infrastructure	0.22	0.4	0.97	0.7
Training/Technology Transfer	0.80	1.4	1.10	0.8
Monitoring and Evaluation	0.14	0.2	0.24	0.2
Consultants	0.21	0.4	0.63	0.4
Institutional Restructuring			0.34	0.2
Research Development Programme	2.19	3.8	2.47	1.8
<b>Total</b>	<b>17.56</b>	<b>30.4</b>	<b>40.80</b>	<b>29.2</b>
<b>Base Costs</b>	<b>57.61</b>	<b>100.0</b>	<b>139.25</b>	<b>100.0</b>
Physical Contingencies	2.63		5.86	
<b>Total</b>	<b>60.24</b>		<b>145.11</b>	

expenditures on plantation maintenance and operating facilities increase regularly over the Plan as impact of the investment accumulate. This trend is partially blocked by high fourth period industrial investment as plantation yields accelerate quickly. Nearly 21% of Scenario 1 outlay occurs in the first five years with the peak investment in the second five years, about 34% of the total estimated cost. The third period amount drops to 20% and then rises to 25% in the last period. In Scenario 2 the trend

is slightly different. The investment requirements are 16%, 28%, 25% and 31% of the total outlay, respectively for each period, respectively. Local expenses account for 64% of costs.

PROGRAMME COMPONENT INVESTMENT

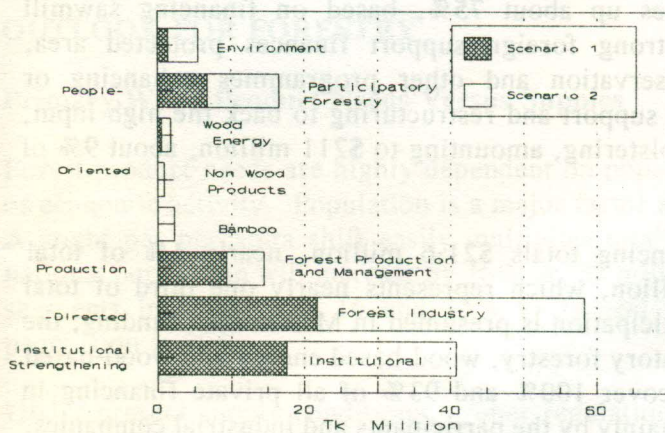


Figure 2 - Scenario Investment Component Details

**Financing Sources** - Anticipated Government financing is substantial, but at the same time, expectations are that the interest of the bilateral and multilateral donors will fully support rational development of Bangladesh's forests. Participation of the private sector, including forest occupants, non government organizations and private sector or beneficiary investment is also important, especially to Scenario 2. Table 8 presents the financing details.

**Government Financing** - Master Plan programmes will considerably improve Government's financing ability. In the short run this results from increasing the selling price for raw forest products.

Over the long run this results both from increased timber production and prices, and much higher forest activity levels. Scenario 1 overall financing is 36% or \$556 million. Although, the major portion is the incremental recurrent costs in terms of staff salaries, and operation and maintenance costs, financing also covers taxes, duties and land acquisition cost. Scenario 2 public financing



shifts drastically because most component implementation falls under proposed enterprises. This shift gives Government a greater flexibility to allocate resources more and more to social development sectors. Estimated public financing in Scenario 2 is \$96 million, representing about three percent of the total Plan costs. Essentially, this amount supports public activities planning, overseeing and regulating the development activities.

Table 8 - Indicated financing plan.

General Financing Plan				
Source	Scenario 1		Scenario 2	
	US\$ Million	Percent	US\$ Million	Percent
GOB	556.2	36	96.4	03
Donors	971.0	63	2,505.2	67
Private	21.6	01	1,128.8	30
Total	1,548.8	100	3,730.4	100

**Donor Financing** - External donors assistance is vital for successful Master Plan implementation. Many programmes include strong social dimensions and equity concerns plus a firm thrust to sustained forest development combined with better resource conservation practices. These are among the major factors calling for prominent foreign participation and support. Other major reasons for external financial support are the benefits enjoyed by the international community by protecting tropical rain forests, maintaining biodiversity, and the limited local financing capacity.

Scenario 1 financing plan anticipates \$971 million, about 63% of the total Plan costs, coming from donor agencies over 20 years. Two key programmes, plantations and participatory forestry, make up about 17% of all foreign financing. Institutional strengthening accounts for about 12% of the proposed external financing. Smallscale sustainable forestry development actually comprises a large financial share in public-directed programmes. Foreign funding is relatively low for industries compared to other programmes, however, due to the large investment needs late in the Plan, financing is still considerable. Major foreign financing is assumed for protected area, biodiversity conservation, as well as soil conservation activities.

For Scenario 2, total external financial assistance increases very slightly to 67%, but in absolute terms, the external financial requirement is substantial. About \$2.5 billion is the expectation from external sources. Forest plantations and participatory forestry account for about 13% of all foreign funding. Industrial investment makes up about 75%, based on financing sawmill modernization and papermill expansion. Strong foreign support finances protected area, biodiversity, watershed protection, soil conservation and other programmes enhancing or protecting environmental values. Institutional support and restructuring to back the high input, high yield programme requires considerable bolstering, amounting to \$211 million, about 9% of the envisaged external financing.

**Private Sector Financing** - Scenario 1 financing totals \$21.6 million, nearly 1% of total investment. Scenario 2 increases to \$1.1 billion, which represents nearly one third of total investment planned. Active private sector participation is presumed in Master Plan funding; the bulk of private financing occurs in the participatory forestry, wood-based energy and wood-based industries programmes. These programmes cover 100% and 93% of all private financing in Scenario 1 and 2 respectively, and are carried mainly by the participants and industrial companies. Private sector financing also includes small scale operations in wood and non wood forest industries plus non government agencies, and beneficiary labour input.

### Financial and Economic Results

Financial and economic analysis reveals that both Scenarios are economically viable. Scenario 1 yields 14 and 17% in economic and financial terms, respectively. In comparison, internal rates of return for



Scenario 2 are higher - 20 and 27%, respectively. Net present value in Scenario 1 is Tk 12 billion, discounted at 12% interest annually, while Scenario 2 increases significantly to Tk 63 billion, a fivefold increase. Both development options assume existing forest resources and sunk plantations costs. Scenario 1 yield is inflated as the forest protection cost for benefit-sharing is not charged in plantation development. In contrast, Scenario 2 not only includes such costs, it excludes all income from environmental development programmes. However, higher Scenario 2 return mainly comes from increased growth targets; these higher rates also explain the major increase in net present value accruing from plantations maturing after the Plan period.

**Sensitivity and Risks** - A major risk to successful public forestry programmes is the failure of the local communities to respond as fully as expected. This risk relates more to programme social and institutional aspects rather than to physical, technical or price-related variables. In particular, the danger of inadequate participation by local communities is guarded against through attractive benefit-sharing arrangements. Furthermore, great emphasis goes on training and motivational activities, including non government organizations, to further reduce this risk.

For plantation development on State lands, inadequate forest protection is the chief risk anticipated. Theft, illegal grazing, fire and inadequate forest management practices cause most of Bangladesh's forest depletion. However, the Plan envisages large scale peoples' participation and benefits from forestry activities. Expectations are that people's vested interest will provide adequate protection and that these risks are manageable, provided that organization and management are enhanced and operations conducted as proposed.

**Introducing Scenario 2** - Adopting major institutional change dictates a closely piloted transition requiring a progressive, small, highly coordinated unit with a strong Government commitment and backup. A two-year period is the target for introducing major policy, managerial and administrative reorganizational, legal and regulatory changes, including forming the National Forestry Board. Complete changeover should have a completion date of five to six years to avoid stagnation. System changes could easily take 10 years but a short period is more suitable to track and steer change. Government plans and policy already in process to encourage private investment will effect the forestry sector. These, in combination with increased wood supplies, improved operating conditions and more attractive tenure conditions must reflect the inherent investment levels and risks. All the preceding factors are pivotal to attract the private investment called for.

## **OUTLOOK FOR FORESTRY**

### **Primary Wood Product Needs Versus Supplies**

Forest product needs are highly dependent on population and available resources, as well as the level of economic activity. Population is a major factor affecting all programmes and events in Bangladesh. A slight per percapita shift easily multiplies total product requirements. Expectations are that the national population will increase by 36% to 152 million by 2013. Meanwhile, the urbanized and literate segments increase from 16 and 25% to 18 and 35%, respectively over the Plan, while the rich proportion is 20%.

Under present supply conditions, proper regulation and forest management practices, the roundwood yield limit is about eight million cubic metres annually. However, actual supply exceeds this level due to over felling. Fuelwood and sawlogs are the chief products required both today and in the future. Current wood requirements are fuelwood 11.6 million, sawlogs 6.6 million, and pulpwood and poles 0.8 million cubic metres annually.

Table 9 shows projected supply potential for major forest product over the Plan, compared to 2013 demand. Analysis indicates an increasing future reliance on plantation wood supplies, accompanied by



Table 9 - Forecasted major forest products demand and supply.

Projected Annual Roundwood Needs and Supply, 000m <sup>3</sup>				
Item	2013 Need	Supply Potential		
		1993	2003	2013
<b>Sawlogs</b>				
Status Quo	6,639	1,285	1,433	1,829
Scenario 1	7,223	1,318	1,544	2,739
Scenario 2	15,223	1,421	1,675	5,884
<b>Pulpwood</b>				
Status Quo	505	284	478	518
35% Literacy	723	293	628	655
100% Literacy <sup>1</sup>	1,449	293	1,122	1,640
<b>Poles</b>				
Status Quo	328	154	149	296
Scenario 1	328	179	245	830
Scenario 2	379	168	907	3,054
<b>Fuelwood</b>				
Status Quo	11,553	6,179	6,829	8,208
Scenario 1	8,445	6,242	7,449	10,054
Scenario 2	15,124	6,122	9,331	15,072

<sup>1</sup> Equivalent annual paper needs: 35% literacy 321,000 tonnes, 100% literacy 542,000 tonnes, and \$400 GDP 462,00 tonnes.

a decline in sawlogs. This trend has two major ramifications for industry - future supplies become increasingly small-sized and species proportions change dramatically. This requires different equipment for handling and manufacturing as well as altering the type of final products compared to today's standards.

By Plan end, Scenario 2 forecasts a tripling in total wood supply and Scenario 1 almost twice today's capacity. Projected wood supply potential is 14.2 and 25.6 million cubic metres annually for Scenario 1 and 2, respectively. These estimates compare to Status Quo's 10.9 million, excluding the effect of the continuing deforestation trend.

### Forested Area

Presently, medium to dense forests cover 1.1 million ha in Bangladesh. On a percapita basis, every person has 75 m<sup>2</sup> of state forest. If past trends continue, percapita area declines 39% by 2013 and actual net area by 4%. A regular planting programme cannot cope with expected deforestation and population growth. In Scenario

1, percapita state forest declines 16%, but total area increases by 20%. Under Scenario 1 the planting programme offsets deforestation but cannot keep pace with population growth. With Scenario 2, percapita and actual forest area both increase, estimated at 30% and 77%, respectively. Scenario 2 plantations easily offset the projected decline in deforestation and more than exceed the population change. Figure 3 illustrates the situation. Private forest percapita is forecast to keep up with increasing population, compared to State forest resources, except for Scenario 2 when it increases sharply.

Without the proposed uncompromised changes needed in policy, management and institutions, natural forest resources will continue to decline.

### Anticipated Impacts

**Environmental Consequences** - Initial examination of the environment impacts clearly shows the high potential for continued negative impact on the scarce forests in Scenario 1. Scenario 2 introduces adequate measures and programmes to base sustainable resource management and improve environment protection. Plan proposals significantly enhance environmental preservation and awareness within the nation, the Ministry, the Forest and Environmental Departments, and the private sector. Programme components call for much increased public involvement, community-based resource management, social equity in the sector, as well as cooperation amongst all forestry related agencies.

### PROJECTED FOREST COVER AREA

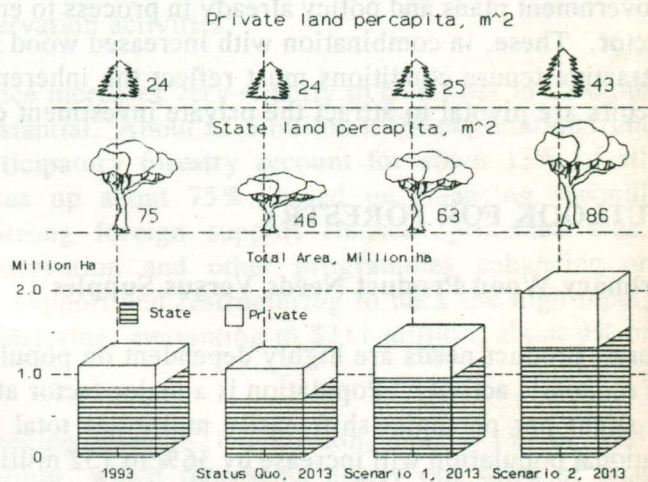


Figure 3 - Forest area outlook



Specific expected impacts are:

- A new department for conserving natural resources and protected area management and an agency for coastal development.
- Multiple use and much more productive management of forest resources.
- Communities directly involved in resource management.
- Staff trained in environmental concerns and assessment.
- Increased soil and watershed protection.
- Increased public awareness of forestry environmental issues.

In particular, the increased emphasis and positive benefits of Scenario 2 are:

- Minimum dependence on Hill Forests for future commercial forest production.
- Reduced encroachment achieved by improved benefit-sharing, and more appropriate tree-growing systems.
- Decreased forest land degradation and increased productivity.
- A significant bamboo programme offsetting the expected natural death of the major bamboo species.

**Social Benefits** - Required programmes have significant positive social benefits. Those chiefly arising from genuine local involvement and shared benefits are:

- A strong base for Government's increasing focus on poverty alleviation and environment.
- Better local decision-making regarding species choice and forestry practices.
- Increased use of substitutes for wood energy.
- Women as a target group to acquire tenure and share directly in benefits.
- Increased support to private forestry, particularly on the homesteads.

**Economic Values** - Value added potential ranges from Tk 29 to 103 billion and employment opportunities from 1.1 million to 2.2 million for Scenarios 1 and 2, respectively, compared to Tk 21 billion and 0.8 million employed today, illustrated in Figure 4. Estimated future revenue potential by 2013 varies from Tk 0.2 to 2.0 billion for Status Quo and Scenario 2 alternatives at current prices. Scenario 1 potential is intermediate at Tk 0.9 billion compared to Tk 0.3 billion today. Non wood forest products currently bring about Tk 20-25 million annually and should generate similar revenue increases as traditional products under the proposed development, Tk 170-210 million annually. Increased resource revenues can finance a major portion of public investment providing Government raises wood prices to reflect properly their national scarcity.

LONG TERM ECONOMIC POTENTIAL

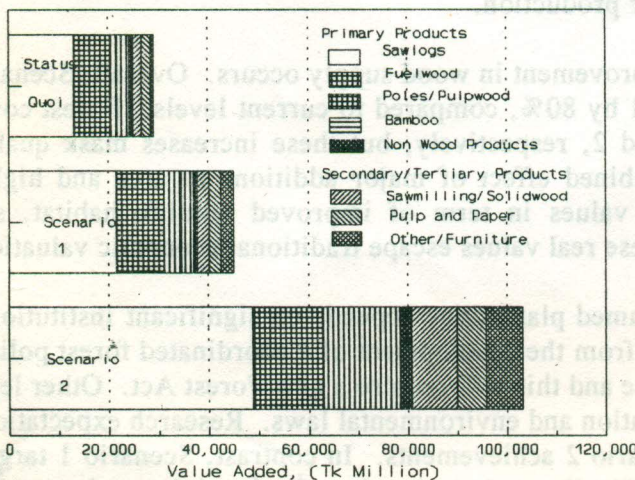


Figure 4 - Estimated annual forestry sector economic potential by 2013.

Current revenues cover 46% of expenditure. In comparison, Scenario 2 potential revenue is 250% of annual expenditure in 2013. Analysis of Scenario 1 shows that plantation replacement costs substantially exceed market wood prices and therefore the revenue expenditure ratio is unrealistic; the present position is more stark.

An environment option open to government is to import forest products to avoid commercial use of Hill Forest resources. Depending on international products substituted, this option would cost anywhere from \$37 - \$225 million over the Plan, valued on present net worth and ignoring foregone local employment.



**Industrial Outcome** - Expected beneficial industrial impacts chiefly relate to increased economic and resource efficiency in the following ways:

- Elimination of public or private industries with high wastage and poor economic returns.
- Privatization of public industries capable of running profitably.
- Improved conservation through increased efficiency in the sawmilling industry.
- Increased supplies of major forest products to maintain or increase current consumption levels or provide more opportunity for export oriented industries

**A permanent well constructed plantation road network:**

- Allows the continued extensive use of labour in future extraction operations, avoiding dependence on mechanised equipment.
- Provides better access for protection and intensive management and helps keep production costs low.
- Offers new equipment to support continued high forest extraction and allows harvesting of valuable plantations on steeper ground with minimal physical effect on growing sites.
- Avoids environment damage and high wood waste levels associated with extraction operations served by temporary roads.

Recapturing existing sawmill waste can supply the forecast population's sawnwood needs over the Plan. Beneficial impact from the pulp and paper programmes comes from import substitution and associated foreign exchange savings. Scenario 2 provides sufficient paper to support planned higher literacy rates, packaging material for a major drive in exports, plus the speciality papers used by the more affluent economy targeted by Government's current planning.

Consequences for the public sector industry is strictly financial, the chief result is annual cash savings of Tk 16-20 million by eliminating inefficient and obsolete solidwood manufacturing companies. Eventual expansion in the forest industry should more than offset any negative effects of required layoffs.

**Wood Energy** - During the Plan, programmes have the potential to save the equivalent of 3.7 million cubic metres of fuelwood, worth Tk 3.3 billion at present market prices. Improved cooking stoves offer the greatest potential for reducing fuel biomass demand and enhancing social equity, followed by charcoal making and biogas.

**Bamboo Improvement** - An increased bamboo supply sustains present percapita domestic and industrial usage levels as the population increases and the major forest species dies naturally. This makes available sufficient material for basic housing needs for the vast majority of the rural population and also supports domestic printing and writing paper production.

**Forest Management Changes** - A substantial improvement in wood supply occurs. Overall, Scenario 2 increases wood supply by 220% and Scenario 1 by 80%, compared to current levels. Forest cover area increases by 20 and 77% in Scenario 1 and 2, respectively, but these increases mask quality improvement in forest cover density. The combined effect of major additions to area and higher vegetation density has immense environmental values in term of improved wildlife habitat, soil protection, water retention and conservation. These real values escape traditional economic valuation.

**Institutional Consequences** - Achieving programmed plantations depends on significant institutional restructuring in Scenario 2. The initial impact is from the development of a coordinated forest policy. Legislation and regulatory changes must take place and this will require a new Forest Act. Other legal areas needing change are the protected area legislation and environmental laws. Research expectations are high and if not achieved will hamstring Scenario 2 achievements. In contrast, Scenario 1 targets Do not depend on new technology and methods. Finally, technical and professional demands on staff



will increase immensely and working attitudes will have to change. This will require proper in-service training facilities, organizational restructuring and a progressive attitude to using human resources effectively.

**Budgetary Implications** - Government's contribution during the first five Scenario 1 Master Plan years is about Tk 3.0 billion. This amount represents about 36% of the forestry sector allocation and about 7% of the current five year plan outlay. During the next five-year plan, allocation to the forestry sector must increase by at least five percent to meet these financial requirements. In comparison, Scenario 2 public financing falls by four fifths. Donor implementation assistance is vital for the Plan's successful adoption. Most of the programmes proposed include strong social and equity dimensions and environmental concerns; and these are among the major facts calling for prominent foreign assistance in Master Plan financing. Scenario 1 anticipates \$1.0 billion, 63% of total Plan costs, coming from different donor agencies. In comparison, the Scenario 2 percentage requirement increases slightly, but in actual figures, the amount is \$ 2.5 billion over the Plan.



"It must be remembered that there is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new system. For the initiator has the enmity of all who would profit by the preservation of the old institution and merely lukewarm defenders in those who would gain by the new one". Machiavelli: The Prince. (1513)

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